

A BIOLOGICAL EVALUATION OF A
MOUNTAIN PINE BEETLE OUTBREAK IN
YELLOWSTONE NATIONAL PARK
1967

The mountain pine beetle outbreak in the southwest corner of Yellowstone National Park (Bechler - Cave Falls area) is part of a general infestation that covers a large portion of the neighboring Targhee National Forest. Significant mountain pine beetle activity on adjoining National Forest land first showed up in 1964 and has increased in size and intensity since then. Control was started in 1965 and continued until the present time and although this effort has reduced immediate tree losses and slowed the spread of the infestation, it did not preclude the eventual establishment and subsequent buildup of mountain pine beetle populations in the Park. The present infestations in the Park, which reached concernful proportions in 1966, covers approximately 6,000 acres and extends from Winegar Lake west to the Park boundary and north to Robinson Lake. Heaviest tree killing occurs near the south Park boundary and decreases in intensity to the north. The most recent survey data shows that this area contains slightly more than 18,000 lodgepole pines presently infested. 1/

Biological evaluations to determine the status and trend of the infestation were made in this area on October 10, 1967. Performing these evaluations were entomologist William Klein and Forestry Technician Otto Sandin. Data collected and analyzed for determination purposes included brood and attack density counts, attack ratios, counts of parasites and predators, and other factors which may influence the trend of the infestation. In addition, a prism cruise was integrated with routine evaluation procedures to provide a cursory measure of stand structure during the early stages of a potentially serious outbreak. The results of this cruise together with pertinent biological data follows:

Tree <u>2/</u> Sp.	No. Trees/Acre By Dia. Class <u>3/</u>							Total Basal Area Per Acre (Sq. Ft.)	Attack Ratio		Average Fall Brood Density/ Soft.	Trend <u>4/</u>
	8	10	12	14	16	<16	Total		New	Old		
LPP	8	10	12	14	16	<16	Total	(Sq. Ft.)	New	Old	Soft.	
Live	61.6	39.6	31.2	17.5	1.6	.6	152.1	100.00	3.2	1	416	Increasing
Dead	2.8	.9	1.8	.5	.8	-	6.8					

1/ Survey - Mountain Pine Beetle Bechler River Area, Yellowstone National Park, 1967. Mimeographed report. 3pp. (Map)

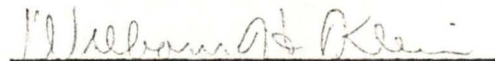
2/ Area contains Engelmann spruce and Douglas-fir but none were picked up on plots.

3/ 20 variable plots - B.A.F. 10.

4/ Determined from sequential sampling plan developed by Intermountain Forest and Range Experiment Station.

These data show the infestation to be epidemic with a 320 percent increase in new attacks over that recorded in 1966. Operational surveys conducted by Park personnel confirm this estimate for they show an increase in the number of new attacks per acre from 0.9 in 1966 to 3.09 in 1967. The cruise data shows that approximately 7 trees per acre have been killed since the start of the infestation. Additional biological factors including the apparent scarcity of an effective parasite and predator complex, the presence of plentiful and seemingly vigorous mountain pine beetle broods, the lack of natural tree repelancy, and most important, the availability of a sufficient number of host mature and overmature lodgepole pine, indicate continuing epidemic conditions and a high rate of tree killing for several years to come. If the infestation is left unchecked, and unexpected natural control factors do not intervene, perhaps as much as 50 percent of the lodgepole pine stand, exceeding 8 inches in diameter will be killed.

In considering control alternatives it should be understood that this infestation did not result entirely from beetle flights from treated and untreated areas in the adjacent infestation. This is one infestation source, certainly, but it is not the underlying cause of the present situation. The underlying cause of this and all other mountain pine beetle infestations is the presence of contiguous, relatively even-aged stands of mature and overmature lodgepole pine. When the stands present this condition, they offer little natural resistance to destructive forces until these forces change the stand to a state where they can barely survive. We as resource managers, have helped perpetuate these conditions by attempting to protect the stand from all destructive agents, including insects, disease, and fire, and the longer we do this without materially changing the stand conditions, the more tenuous and difficult long-term protection becomes. Under a multiple use concept, these conditions can be changed by converting the stands by logging to a less susceptible state, but in single use management this concept is neither practical or desired. This, then, leaves only one control alternative besides letting the infestation run its natural course, and that is single tree control (standing spraying). This method may momentarily check the spread of the infestation and reduce immediate tree losses, but may prove to be only an expensive delay of the inevitable.


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